2004 GALVESTON BAY INVASIVE SPECIES RISK ASSESSMENT
INVASIVE SPECIES SUMMARY
Created by: Environmental Institute of Houston, University of Houston-Clear Lake
and the Houston Advanced Research Center

Common Name: Giant Salvina, kariba weed

Latin Name: *Salvinia molesta*

Category: Aquatic Plant

Place of Origin: Southeastern Brazil

Place of Introduction:
"Giant Salvinia was first reported as established outside of cultivation in the United States in 1995 at a pond in southeastern South Carolina (Johnson 1995). The 1.5 acre infestation was eradicated within a year, before plants had spread locally." http://www.ceris.purdue.edu/napis/pests/gs/facts/hist.html (Accessed 20 March 2003).

Date of Introduction: 1995

States Effected:
"In the US it has been observed in South Carolina (eradicated), Texas, and Louisiana. (In October 2000, it was discovered in a number of sites in southeastern North Carolina.) It represents a significant danger in any warm, slow-moving bodies of water. Any area which might support Water Hyacinth (*Eichhornia crassipes*) is probably at risk." http://tncweeds.ucdavis.edu/alert/alrtsalv.html (Accessed 20 March 2003).
"Infestations have been reported from several states including Texas, Alabama, Mississippi, Louisiana, Florida, and Hawaii. The predicted range of the plant in the U.S. approximates the current distribution of water hyacinth." http://www.wes.army.mil/el/pmis/plants/html/salvinia.html (Accessed 20 March 2003).

Life History:
"Fruiting bodies or sporocarps are in clusters along the submersed leaves. Salvinia species have two distinct kinds of spores, megaspores or female spores and microspores or male spores. It is believed that *Salvinia molesta* in the United States is not fertile. However, giant salvinia reproduces very effectively through vegetative means. Stems fragment as plants mature and new plants develop from apical and lateral buds. Giant salvinia will withstand periods of stress, both low temperature and dewatering, as dormant buds. In more temperate areas, giant salvinia may not overwinter in an evergreen state, but may function as an annual. However, it is still expected to produce heavy growth in those conditions too (Colette Jacono, USGS)." http://www.wapms.org/plants/salvinia.html (Accessed 20 March 2003).

Growth/Size:
"An individual plantlet consists of a horizontal stem that produces two floating leaves (fronds) up to 25 cm long and a highly dissected submerged frond up to 25 cm….The globose sporocarps are densely hairy, short stalked and 2-3 mm in diameter." http://www.wes.army.mil/el/pmis/plants/html/salvinia.html (Accessed 20 March 2003).

Habitat:
"Giant salvinia grows best in stagnant or slow flowing water. Quiet waters of lakes, ponds, bays, oxbows, ditches, swamps, and marshes may be susceptible to invasion. In Ceylon, the species has proven to be problematic in rice fields. The rhizomatous plant can rapidly form dense floating mats of vegetation. Disturbance usually results in fragmentation and any fragment having an axillary bud can give rise to a new plant. The optimum temperature range for growth is 25-28 C and under these conditions plants can double within 1 week." http://www.wes.army.mil/el/pmis/plants/html/salvinia.html (Accessed 20 March 2003).

Attitude (aggressive, etc.):
"This extremely rapidly reproducing plant can double its numbers in as little as 2-10 days, completely dominating waterways. Extremely small fragments are effective, viable propagules. Spore viability is unknown.
The plant is federally prohibited in the US, and is therefore *illegal to sell or possess*!" http://tncweeds.ucdavis.edu/alert/alrtsalv.html (Accessed 20 March 2003).

Physical Description:
"Giant salvinia is a free floating aquatic fern. An individual plantlet consists of a horizontal stem that produces two floating leaves (fronds) up to 25 cm long and a highly dissected submerged frond up to 25 cm. The floating leaves are green, sessile to short petiolate, broadly ovate in shape with entire margins. The midrib extends from the base to the apex of the leaf. The upper surface of the floating fronds is covered with parallel rows of hairs that have a characteristic "cagelike" structure at the apex. When plants are young, these leaves are small and float on the water surface. As plants age, the floating leaves become crowded and fold against one another resulting in a more vertical leaf position. The brown, feathery submerged leaf resembles and functions as a root. This frond bears the sporocarps or spore forming structures. The globose sporocarps are densely hairy, short stalked and 2-3 mm in diameter. Spores are rarely formed and if present are deformed and infertile." http://www.wes.army.mil/el/pmis/plants/html/salvinia.html (Accessed 20 March 2003).

Management Recommendations / Control Strategies: include references for existing site-specific strategies
"It is vital that infestations of all sizes are reported and completely eradicated. Authorities in Texas note that the *Salvinia* population at

one infestation has exploded so rapidly, in just a month, that chemical control is their only viable alternative.
The most straightforward control is by preventing additional infestations. *Salvinia* reproduces so rapidly that infestations rapidly become impossible to eradicate using manual methods!
A biocontrol has been developed (*Cyrtobagous salviniae*) and may be effective in the near future. Until then chemical control may be the only viable option available." http://tncweeds.ucdavis.edu/alert/alrtsalv.html (Accessed 20 March 2003).

"The good news about managing giant salvinia is that control has been demonstrated without the use of toxicants. In tropical parts of Australia, India, Namibia, Papua New Guinea, and Botswana, introductions of the weevil Cyrtobagous salviniae suppressed populations of this aquatic weed. Eradication of big infestations generally requires the use of commercially available herbicides in addition to biological control organisms. Several institutions' scientists, including Agriculture & Animal and Plant Health Inspection Service (APHIS), are currently studying the success of C. salviniae and are developing plans for its use. Also, APHIS is working with other Federal and State agencies to prevent the spread of giant salvinia by educating the public on how this invasive, noxious weed fouls waterways and travels over land." http://www.iisgcp.org/EXOTICSP/giantsalvinia.htm#control (Accessed 20 March, 2003).

Agencies Collecting Data:
Gulf of Mexico Program
The Nature Conservancy
The Western Aquatic Plant Management Society
USGS

References (includes journals, agency/university reports, and internet links):

1. TNC - http://tncweeds.ucdavis.edu/alert/alrtsalv.html
2. STPL - http://www.wes.army.mil/el/pmis/plants/html/salvinia.html
3. NAPIS - http://www.ceris.purdue.edu/napis/pests/gs/index.html
4. WAPMS - http://www.wapms.org/plants/salvinia.html
5. IISGCP - http://www.iisgcp.org/EXOTICSP/giantsalvinia.htm#control

Available Mapping Information:
USGS - http://salvinia.er.usgs.gov/html/sm_progression.html
NAPIS - http://www.ceris.purdue.edu/napis/pests/gs/imap/gsmolall.html
STPL- http://www.wes.army.mil/el/pmis/plants/html/salvinia.html
PLANTS - http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=SAMO5
USGS (predicted range) - http://salvinia.er.usgs.gov/html/predicted_range.html